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Title: Surface Analysis of TMSDMA Molecules Adsorbed on SiO2/Si Substrates for Area Selective Deposition
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Abstract: Area-selective atomic layer deposition (AS-ALD) is used by the semiconductor industry for bottom-up manufacturing of semiconductor devices. One technique to achieve selectivity is to adsorb a molecular film to regions of a patterned substrate to block the adsorption of another species. N-(Trimethylsilyl)Dimethylamine (TMSDMA) has a strong affinity for chemisorption on SiO2 surfaces while having low affinity for chemisorption on Si and non-oxidized metal surfaces. Therefore, it can be used to block deposition of metals on SiO2, while allowing deposition of metals on Si or metal surfaces. Samples of TMSDMA adsorbed on Si(100) substrates with a 1000 thermal oxide and various post-exposure surface treatments have been prepared by the Thin Films group at TEL. Surface treatments include ozone exposure, H2 plasma treatment, H2 plasma treatment followed by H2O vapor, and NF3 exposure. Water contact angle measurements were taken of each sample to qualitate relative surface passivation and changes in the inhibiting layer. In addition, X-Ray photoelectron spectroscopy is being used to determine the chemical state of the TMSDMA molecules after surface treatments.